NORTH ENTRANCE ROAD
Yellowstone Roads and Bridges
Between Gardiner, MT,
and Mammoth Hot Springs, WY
Gardiner Vic.
Park County
Montana

HAER No. MT-93

WRITTEN HISTORICAL & DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD

NORTH ENTRANCE ROAD
~~Yellowstone National Park~~
~~HAER No. MT-93~~

HAER MT-93

Location: Between Gardiner, Park County, Montana and Mammoth Hot Springs, Park County, Wyoming, Yellowstone National Park

Construction date: 1879

Designer: U.S. Army Corps of Engineers, National Park Service, Bureau of Public Roads

Present Owner: National Park Service, U.S. Department of the Interior

Present Use: Park entrance road

Significance: The North Entrance Road was for years the most popular entrance to Yellowstone National Park, and remains an important gateway.

Project Information: This project was conducted in summer 1989 under the sponsorship of Yellowstone National Park, the Historic American Engineering Record, and the Rocky Mountain Regional Office, all entities of the National Park Service, U.S. Department of the Interior.

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HISTORY

This is one in a series of reports prepared for the Yellowstone Roads and Bridges Recording Project. HAER No. WY-24, YELLOWSTONE ROADS AND BRIDGES, contains an overview history of the park roads.

History of the North Entrance Road

A route from the Upper Yellowstone Valley to Mammoth Hot Springs area existed prior to the creation of Yellowstone National Park in 1872, but it would be many years before it could be called a road. In 1879, Superintendent Philetus Norris termed "a portion of the canon of the main Gardiner, and all of those of the west and middle branches, are utterly impassable for even a bridle path."[1] Two different routes left the mouth of the Gardner River for the springs, but neither were passable, and Norris did not want to expend much money on their improvement. He spent considerable time trying to site a suitable location. "In this I finally succeeded, and without sharp curvatures, carried a line of easy grades for some 3 miles, and with only a moderate amount of bridging, constructed a road much shorter and in all respects superior to what could have ever been made upon either of the other routes at manifold its cost."[2] Norris avoided the Gardner River Canyon and constructed a road in the same approximate location as the older tourist route.

The North Entrance remained the most popular, and usage increased after the Northern Pacific Railroad completed their line to near Gardiner, Montana in 1883. One of the first jobs the Army Corps of Engineers undertook was improvement of the 4-mile section of road between Gardiner and Mammoth Hot Springs at a cost of about $50. After filling ruts and removing stumps on the old road, Lt. Dan Kingman recommended abandoning the route for a new one following the Gardner River through the canyon. The steep inclines of the old road presented many problems, particularly to freighters and especially in wet weather.[3]

Kingman knew the canyon route, with its exceptional obstacles, would be expensive to construct and estimated it would cost approximately $2,000 per mile, more than double the cost of work in other areas of the park. In 1883, he spent $5,740 and estimated an additional $3,000 would be needed to complete the job. Before the crews stopped for the winter, an excellent road had been

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[1] Philetus Norris, Superintendent, Yellowstone National Park, *Report Upon the Yellowstone National Park for the Year 1879* (Washington, D.C.: Government Printing Office, 1880), 3-4.

[2] *Ibid.*.

[3] Kingman Report for 1883, 11-12.

constructed up to the point of the rock work. Kingman hoped to complete the project before the first visitors arrived the following spring.[4]

In the annual report for 1889, several bridges, without specific locations, spanning the Gardner River were listed:

> three spans of 33 feet--no truss
> three spans of 32 feet--King post
> one span of 28 feet, a coulee--no truss
> two spans of 40 feet and 20 feet--King and Queen post[5]

In 1901 and 1902, Hiram Chittenden supervised work on the road and in 1903, one his major achievements, the construction of the North Entrance Arch, was completed. Chittenden felt that the heavily traveled, highly visible northern park entrance at Gardiner deserved an impressive entrance gate. The Northern Pacific Railway's station, designed by Robert Reamer, had been completed adjacent to the park boundary on the western edge of Gardiner and the new route into the park was scheduled for construction. The railway and the wagon roads ended in two loops, with the train station placed in between. One side of the station was used to unload the passengers and the other side for the conveyance of carriages. On the carriage driveway side, an artificial pond was constructed. Approximately 30' above the railway station grounds, Chittenden constructed the entrance arch. The corner stone for the entrance arch was laid in a ceremony attended by President Theodore Roosevelt on 24 April 1903, and the first visitors passed through the arch on 1 September.[6]

By 1903, the Army road was widened to 25', the grades had been reduced to 8 percent, and the road had been surfaced with gravel or macadam. All the old wooden culverts had been replaced with vitrified clay-pipe or cast-iron

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[4] *Ibid.*.

[5] *Report of the Secretary of War Being Part of the Messages and Documents Communicated To The Houses of Congress and The Beginning of The First Session of The Fiftieth Congress in 4 Volumes, Volume II - in four parts, Part IV* (Washington, D.C.: Government Printing Office, 1889), "Annual Report of Maj. Charles J. Allen, Corps of Engineers, Officer in Charge, for the Fiscal Year Ending June 30, 1889," 2863.

[6] Hiram Chittenden, U.S. Army Corps of Engineers, *Annual Report Upon the Construction, Repairs,* and *Maintenance of Roads and Bridges in the Yellowstone National Park and Construction of Military Roads from Fort Washakie to Mouth of Buffalo Fork of Snake River, Wyoming,* and *Erection of Monument to Sgt. Charles Floyd in the Charge of Hiram A. Chittenden, Captain Corps of Engineers, Appendices FFF* and *KKK of the Chief of Engineers for 1904* (Washington, D.C.: Government Printing Office, 1904), 2889.

culverts. The four crossings of the Gardner River were bridged with steel structures set on monolithic concrete abutments.[7]

During the autumn of 1906, a dry slide occurred near the first bridge from Gardiner, followed my more sliding during the winter. Another slide developed 1 1/2 miles further down the road and was removed by sluicing. The river continually undermined the road, washing out the dry wall supporting it. Peek suggested that if repairs were not effected, the road would be washed out entirely, forcing travelers to use the old road through the hills from Gardiner to Mammoth Hot Springs, a route abandoned for at least 12 years.[8]

Severe damage and deterioration affected this section for many years. In 1908, "considerable work" was required again at the big slide near Gardiner. To prevent the road from washing out, the wall was faced with planks held in place with large steel bars. Lt. Peek suggested replacing a 100-yard stretch of dry-laid wall with a mortared stone wall. In 1909, another 500 yards of earth was removed from the big slide below Gardiner and an unsuccessful attempt was made to divert the spring at the head of the slide. More retaining wall was washed out by the river, but the roadway was saved by construction of a revetment of logs and sandbags. Two years later, the park erected its first concrete revetment wall about 3 1/2 miles from Mammoth, but the dry rubble wall along the Gardner continued to deteriorate. In 1912, teams carrying in the park coal supplies "so shook the road at the dangerous and narrow part" that much of the roadway collapsed, leaving only a 3' wide section for travel. Bridges and culverts were in poor condition, and the road was described as "practically impassable for any class of vehicles on account of earth slides, boulders, broken culverts and an unserviceable bridge." The bridge, located near Mammoth Hot Springs, was dismantled and replaced with a new timber structure with a 25' span and 12' approaches at both ends. Boulders in the roadbed were removed by blasting and excavation, and the entire road was graded. More mortared rubble wall was constructed in 1913, and the graveled bank near Gardiner was sloped back. In 1915, the troublesome slide came down again, and 800' of rubble had to be removed.[9]

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[7] Idem, *Annual Report Upon the Construction, Repairs and Maintenance of Roads and Bridges in the Yellowstone National Park and Construction of Military Roads from Fort Washakie to Mouth of Buffalo Fork of Snake River, Wyoming, and Erection of Monument to Sgt. Charles Floyd in the Charge of Hiram A. Chittenden, Captain, Corps of Engineers Being Appendices GGG and KKK of the Annual Report of the Chief of Engineers for 1903* (Washington D.C: Government Printing Office, 1903), 2890.

[8] Ernest Peek, Lieutenant, U.S. Army Corps of Engineers, *Annual Report of the Chief of Engineers for 1907* (Washington, D.C.: Government Printing Office, 1907), 2468.

[9] Peek, Annual Report of the Chief of Engineers for 1908 (Washington, D.C.: Government Printing Office, 1908), 2547; *Report of Inspection of Bridges in the Yellowstone National Park, made September 24, 25, 26, 1909," with recommendations by request of Capt. Wildurr Willing, Corps of Engineers,*

Throughout the summer of 1917, crews worked diligently to keep the canyon road open, but the 1918 spring thaw caused extensive damage to one mile of the road. One of the last projects the Army Corps of Engineers supervised before turning over the road construction and improvements to the newly created National Park Service was making improvements to the old wagon or freight road as it had to be used while the main road was reconstructed.[10]

Despite recommendations from the Corps of Engineers that the entrance road be reconstructed over the hill, National Park Service Director Stephen Mather favored reconstruction through the canyon. In fact, he called the construction of a new road through the Gardner River Canyon the first important engineering project to be undertaken by the newly formed NPS Engineering Division.[11] However, annual reports for the next few years indicate that mostly improvements and not reconstruction were undertaken. In 1920, considerable graveling, some grading and log cribbing was placed to prevent washing out by flood waters. In 1921, 1,300 cubic yards of material was moved from the slide area which had moved 15' during the past year. In 1923, about 400' of road near the 2 mile point was widened and 1700 cubic yards of rock was blasted from the sandstone cliffs above the roadway.[12]

U.S.A.; C. H. Knight, C. W. Kutz, and Jay J. Morrow, Report Upon the Construction, Repair, and Maintenance of Roads and Bridges in the Yellowstone National Park and Report Upon the Road Into Mount Rainier National Park and Report Upon the Crater Lake National Park (Washington, D.C.: Government Printing Office, 1911), 3030-3031; H. W. Child, President Yellowstone Park Transportation Company, to Acting Superintendent, Yellowstone National Park, 2 May 1912; William Nespital, "Notes on the Condition of the Old Road from Mammoth Hot Springs to Gardiner," April 10, 1912; C. H. Knight, Army Corps Engineering Officer, to Chief of Engineers, Army Corps of Engineers, 19 February 1912; Lt. Col. L. M. Brett, Superintendent, Yellowstone National Park, to Secretary of the Interior, 14 May 1912; Brett to Secretary of the Interior, 20 May 1912; "Report of Work Repairing Old Wagon Trail between Mammoth Hot Springs to Gardiner," May 27 to June 21, 1912; Brett to Secretary of the Interior, 22 June 1912; C. H. Knight, J. B. Cavanaugh, and J. J. Morrow, *Report Upon the Construction, Repair, and Maintenance of Roads and Bridges in Yellowstone National Park; Report Upon the Road Into Mount Rainier National Park; and Report Upon Crater Lake National Park, Appendices EEE and FFF* (Washington, D.C.: Government Printing Office, 1913), 3269-3270; "Report for November, 1915."

[10] G. E. Verrill and George Zuin, *Report Upon the Construction, Repair, and Maintenance of Roads and Bridges in the Yellowstone National Park; Report Upon the Road Into Mount Rainier National Park; and Report Upon Crater Lake National Park, Appendices EEE and FFF* (Washington, D.C.: Government Printing Office, 1918), 1977-80.

[11] *Annual Report of the Director of the National Park Service to the Secretary of the Interior for the Fiscal Year Ended June 30, 1919* (Washington, D.C.: Government Printing Office, 1919), 46-47.

[12] *Report of the Director of the National Park Service to the Secretary of the Interior for the Fiscal Year Ended June 30, 1921* (Washington, D.C.: Government Printing Office, 1921), 209; *Report of the Director of the National Park Service to the Secretary of the Interior for the Fiscal Year Ended June 30,*

In August and September 1921, a new stone building to house rangers assigned to check traffic at the North Entrance was built. The new structre replaced an "unsightly tent arrangement" near the entrance arch. The building, which was compatible in design and material to the basaltic rock arch, was 15' x 16', with walls 24" thick. The masonry walls were 8' 6" in height with two logs 7" in diameter resting upon them. The dovetailed log gables were covered with a cedar shake roof, and the porch was constructed of flagstones embedded in mortar.[13]

During the 1930s, several plans for the road's relocation and/or reconstruction were discussed.[14] In March 1937, a fire destroyed the checking

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1921 and the Travel Season 1921 (Washington, D.C.: Government Printing Office, 1921), 165; *Report of the Director of the National Park Service to the Secretary of the Interior for the Fiscal Year Ended June 30, 1923 and the Travel Season 1923* (Washington, D.C.: Government Printing Office, 1923), 116.

[13] *Annual Report of the Director of the National Park Service to the Secretary of the Interior for the Fiscal Year Ended June 30, 1921 and the Travel Season 1921* (Washington, D.C.: Government Printing Office, 1921).

[14] One of the proposals was from Gilmore Clark, Landscape Architect from Westchester County, New York who developed a Mammoth Plan.

> The alternative of leaving Mammoth Hot Springs at the northeast corner or through the Transportation Company Grounds and following the hillside in the vicinity of the old high-line road to Gardiner was investigated by logging with automobile and on foot with Abney, although no staked line was run. This proposed route would leave Mammoth Hot Springs from behind the two storage sheds of the Transportation and descend along the east exposed hillside on 2% and 3% grades for the first two miles. This 2 mile point would be directly above a small lake and the purpose of using light descending grades to this point is to make use of the most stable ground and cross the drainage area above the lake in the most desirable place. From this point to the North Entrance approximately 2.5 miles it is necessary to continue on a 5% descending grade as much of the distance as practicable and the line would be then fairly rough, rolling country which would require considerable curvature some of which would approach the minimum radii, a sustained 5% grade for the last 2.5 miles will reach the elevation of the North Entrance without employing development, but some of the country, particularly in the last mile, would necessitate curvature which might almost resemble switchbacks. This route is the shortest and most direct route possible between Mammoth and Gardiner. Running in approximately a due north and south direction, it lies principally on east exposure and almost entirely thru open sagebrush country. Where the line would fall on north exposure or around points with northeast exposure, it would doubtless be subject to deep snow drifts but probably of little more consequence that what would occur on the canyon route as the difference in elevation is not great. This line would pass above the treacherous unstable, shifting ground which is caused principally by seepage from the lake which was mentioned below the two mile point. This line offers the opportunity, when considered with certain alternates of the other entrances to Mammoth Hot Springs, of bringing traffic

station near the North Entrance Arch. A temporary station was built several hundred feet east of the burned station.[15]

On 18 August 1941, a severe storm hit the northern part of the park. The North Entrance Road was closed for several hours because of slides and washouts. Many of the culverts were blocked with debris. Gas shovels and patrol graders were used by the maintenance crew over the following ten days to put the road in good order.[16]

As a result of the 1959 earthquake, some repair work was done in July 1962, but the major work done on this road section was part of Mission 66 project during the 1960s. In addition to surfacing and constructing new guard rails, two new bridges were built to span the Gardner River.[17]

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into Mammoth Hot Springs before making junction with another entrance road of connecting with Mammoth Hot Springs at the logical geographic location, thereby affording the unacquainted tourist an exit from Mammoth Hot Springs in the direction he desires to go. ("Report to Horace Albright by Gilmore Clark, June, 1930.")

[15] Howard Gregg, "Monthly Narrative Report to the Chief Architect," December 20, 1937 to January 20, 1938. File Box 10, Yellowstone National Park. National Archives and Records Center, Denver, Colorado.

[16] Phillip Wohlbrandt, Park Engineer, "Final Report, Project No. 508, Flood Damage, Reconstruction of Mammoth-Gardiner Road, April, 21, 1943."

[17] Fixed Property Records for Yellowstone National Park, National Park Service, Rocky Mountain Regional Office files, Denver, Colorado.

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Season 1923. Washington, D.C.: Government Printing Office, 1923.

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